

TITLE OF THE INVENTION  
~~A MAGNETOMECHANICAL SYSTEM OF THE CAUSED RECOIL'S~~  
~~REDUCTION FROM A GUN'S BULLET FIRING.~~

5     **MAGNETOMECHANICAL SYSTEM FOR REDUCTION OF THE RECOIL  
OF A GUN.**

BACKGROUND OF THE INVENTION

10    ~~The invention is referred to~~ A magnetic-mechanical system ~~of~~ for the recoil's power  
reduction, which is developed in a gun upon firing during the shooting time in a gun.  
The gun, ~~as~~ whereas it is a mechanical system and ~~as long while~~ a fired bullet ~~crosses~~  
~~in it runs~~ the distance from the gun-barrel's chamber ~~till~~ to the gun-barrel's muzzle,  
~~functions it acts~~ as a ~~system reaction~~ reactive system like ~~the~~ an internal combustion  
15    engine motors reaction. ~~But except~~ Apart from the gun's recoiled recoil phenomenon  
~~because which is caused~~ of the bullet's loading instantaneous firing in the chamber  
~~because of the bullet's charge,~~ the ~~provoked~~ produced explosion gives to the gun's  
frame an instantaneous ~~dynamical~~ kinetic energy, annihilating any inertia  
phenomenon, which was prevailing in the reference system between the gun and the  
20    user before the explosion.

BACKGROUND ART

~~In order to avoid~~ For the avoidance of the recoil phenomenon the current technology  
25    of portable guns like the ~~revolvers~~ semi-automatic pistols, ~~automated automatic~~  
pistols, submachine-guns and/or other heavy ~~armor~~ weaponry ~~of which guns,~~ the  
recoil systems bring in most cases a ~~absorption~~ recoil spring. ~~and in order to increase~~  
~~the gun—user reference system's inertia.~~ Different technical solutions are used for  
the increase of the inertia of the reference system between the gun and the user, they  
30    ~~use different technical solutions~~ which nevertheless are restricted to small  
improvements in the present-case, like:

1. ~~Through~~ By the addition of a mercury ~~bag to pouch on~~ the gun's front section ~~end in order to~~ so as to cause vertical resultant, in order to increase the gun's inertia ~~during over~~ the gun-barrel's ~~rebound~~ recoil.
2. ~~Through~~ By the gas escape from blow holes of the gun-barrel's ~~upper section~~ top with ~~momentum and direction reverse~~ direction opposite of the gun's ~~rebound during the shooting time.~~ recoil direction upon shooting.

## BRIEF SUMMARY OF THE INVENTION

- 10 The invention, which will be described, is referred to the creation of an absorption – reduction magnetomechanical system of this axial force, which ~~generates~~ causes the recoil. The invention ~~and which is based, one the one hand,~~ on a magnet's (M) presence, which in cooperation with successive ~~recoil~~ springs, of the same or different diameter, ~~with spirals~~ spring's coils or ~~metal-cutting wire's of springs diameter's,~~ controls the acceleration and the deceleration of the slide's ~~retrogression~~ reciprocating motion in a gun. ~~and Also on the other hand, through by~~ the mechanical only method, ~~where wherein~~ one of the (successive) springs, (having the same axial or another axial arrangement level), and (in succession with the ~~above-mentioned~~ pre-mentioned successive springs) ~~participates in~~ takes part to the ~~movements' motions' process,~~ participation with time delay lag. ~~since This happens because~~ its edges do not adjoin ~~abut~~ from the beginning to reference points upon the gun, but only after the firing of each bullet in it. The result of all this function is the biggest possible control of the gun's recoil.
- 25 Brief presentation of figures -1- and -2- of the suggestive solution.

In figure -1- is presented the arrangement of the absorption – reduction mechanism ~~the developmental force of recoil – retrogression absorption – reduction mechanism~~ ~~arrangement is presented and~~ which is consisted of the cylinder's (1), ~~body exteriorly~~ of which, the spring (5) is positioned externally. ~~which~~ The cylinder (1) is divided, by ~~one diaphragm (Y),~~ in two chambers, the chamber (A) and the chamber (B) through ~~one contraction (Y),~~ and in which chambers, ~~on the one hand,~~ the pin axle (4) is inserted. ~~and on the other hand,~~ In chamber (A) is inserted the spring (2) and in chamber (B) is inserted the spring (3). ~~which are secured, on the one hand, from The~~

transversal ~~cover~~ set screw (6) locks the chamber (B) ~~and on the other hand, from and~~  
the ~~washer—separator~~ round nut (7), which is embodied with locks the pin axle (4).  
The ~~separator round nut (7)~~ is screwed on is the one the right edge of the pin axle (4).  
~~edge through which~~ The right edge of the pin axle (4) is grounded with abuts on the  
5 still frame of gun the gun's fixed section and in extent by extension it abuts on with its  
~~handle the gun's handgrip~~. The ~~left pin's~~ expansion extension (4) with the indication  
(P) of the axle (4) penetrates the transversal ~~cover~~ set screw (6), comes to the slide  
area (K) and ~~it is formed~~ forms part or the base on a for the support of the magnet's  
(M), support base, which magnet (M) is secured with is locked by the component nut  
10 (E) and of which magnet (M) the magnetic lines on the one hand, pull attract the slide  
(K) and on the other hand the cylinder (1). with a parallel course towards the exit of  
the gun's gun barrel (R), while In figure -2- the Magnet (M) is supported on the base  
(9), while the extension (P) of the axle (4) because from the pin (4) the indication (P)  
is subtracted.

## DETAILED DESCRIPTION OF THE INVENTION

Figure -1- arrangement analysis.

The big exterior diameter of the cylinder (1) body is coming through the spring (5) of  
which the ~~one right edge is based~~ abuts on the cylinder's wall (T), the flange (T) of  
the cylinder (1) which is configured in a bigger diameter, and the ~~other left edge of it~~  
which spring (5) is based abuts on the gun's slide (K). The pin axle (4) every now and  
25 then brings bears the separators round nut (7) and is formed to the collar (8), which  
round nut (7) and collar (8), designate, immobilize on the one hand, it's the axle (4)  
axial course, and meanwhile on the other hand, they operate function as the recoil  
springs' points of reference of the springs.

The spring (2), entering chamber (A), through by the one left edge steps abuts on the  
30 bulkhead's diaphragm (Y) one surface and by through the other the right edge abuts  
on to the pin's (4) separator the round nut (7) which is screwed on the axle (4).

During their installation, When the springs (5) and (2) are installed in the slide (K)  
under they have the minimum charge compression. The spring (3) is positioned in  
chamber (B) and is secured locked by the ~~cover~~ set screw (6), but since it the length

of the spring (3) is lower shorter than the chamber's (B) height-length, during its initial positioning it isn't strained not even from the minimum initial charge, so the two edges of the spring (3) edges are in a distance, on the one hand, from the cover's set screw's (6) internal surface, and on the other hand, from the separator's collar's (8) surface.

The system's operation during the bullet's firing time function upon firing.

A time-fraction flash before the firing, the springs (2) and the spring (5) have the minimum charge-compression in contrast with while the spring (3), which is located positioned in the chamber (B), is under zero charge compression. since its edges do not osculate at any reference point, while The front surface of the slide's (K) front views, on the one hand, towards the exit of under the gun-barrel, muzzle and on the other hand, and the front surface of the cylinder (1), are osculated with adjoin the magnet's (M) surface.

During the bullet's firing time, Upon firing the deployed gases' pressure reaches touches the point, which is designated as critical for the magnet's pull-over attraction on the slide (K). only, where The slide (K) (independent of the cylinder) places itself is violently set in motion, with increased momentum, cuts the magnetic lines and starts to retrogress recoil pushing and to compress the spring (5), which spring (5) acts over presses the cylinder (1). Nevertheless, on the one hand, The spring (2), because of bigger resistance, and on the other hand, because of and the magnet's (M) pulling force attraction, do not permit the cylinder (1) to drift immediately to regression recoil. So, Thereby the slide (K) continues its regression recoil until it bangs to hits the cylinder's point (S), which is configured shaped in a bigger diameter. On point (S) of the cylinder (1), where the slide (K) is met with hits the cylinder (1), any further spring's (5) compressing compression is interrupted. and As the bullet's gases continue to increase their pressure into the gun-barrel, they reach get the point where it is designated again as which is critical for the magnet's (M) pull attraction (this time) over on the cylinder (1). where Hereat the slide's continuous regression recoil of the slide (K) sets also the cylinder (1) to regression-recoil, which diverges from and keeps it away from the magnet (M).

During Upon this phase, the slide (K), after the spring (5), and the cylinder (1) and the set screw (6), regress recoil as a uniform body an assembly compressing which

compresses the spring (2). ~~Taking into account that~~ Since the pin axle (4) is not moving towards any direction and since the cylinder (1) ~~increasingly regresses~~ recoils, compressing also meanwhile the spring (2), ~~through the cover the set screw~~ (6) because of the fact that it is screwed in the cylinder (1), increasingly minimizes the freedom-degree the space that has the spring (3) in the chamber (B) has between the cover set screw (6) and the separator collar (8). ~~Until Up to this time-point moment,~~ where wherein the expansion takes place from the bullet's firing, and which expansion acts over the slide (K), only two springs ~~take place~~ function as a retroaction system, since they are positioned successively, ~~which means to wit~~ the spring (5) and the spring (2) ~~operate~~ function as one. As long as Since the slide's (K) regression recoil continues is continued with the decelerated movement, therefore the movement of the cylinder's (1) also, and while the spring (2) ~~almost~~ approaches by the 3/5 of the completion of its compressing, then the spring (3) ~~acquires reference points tangential,~~ on the one hand, with abuts on the cover set screw (6), ~~and on the other hand, with the~~ separator collar (8). The increasingly decelerated movement of the slide's (K) and of the cylinder's (1) decelerated movement meets the spring (3) in total inertia, hence ~~this the spring (3)~~ absorbs instantaneously the most of the rest of the slide's (K) recoil energy, before the spring (3) ~~manages to enter to the absolute procedure of~~ compressing.

20 The result is ~~to have an on-the-spot interruption to be interrupted~~ of any further recoil of the slide's (K) regression before it hit the frame and since the gases' expansion has ~~comes upon from the firing is completed,~~ the chamber-slide-system the cylinder (1) and the slide (K) begins to move in opposite direction, ~~which means forwardly~~ with the maximum acceleration, with result to be improved the firing speed of the gun.

25 This is caused of the spring's (3) inertia condition status, which spring (3) acts as ~~percussive mechanism~~ an extra powerful suspension against the slide (K,) with ~~momentum and direction opposite of~~ the slide's (K) regression recoil direction, hence minimizing the recoil tension-intensity and time the duration of the recoil. The instantaneous delay time lag, which ~~comes from~~ is caused of the magnet's (M)

30 presence, causes the gases' maximum expansion and gives bigger initial speed to the bullet, with the consequence of ~~its trajectory's~~ the bullet's firing range increase. ~~It~~ The spring (3) has also positive influence effect to the slide's (K) axial displacements drifts, since ~~its tempering time~~ the slide's (K) time of roll back to the initial position is reduced faster. Except Beyond the magnet's (M) pre-mentioned support method,

where through by the pin's axle's (4) body expansion extension (P) , ~~which penetrates the cover (6) and enters the slide's area,~~ another magnet's support method is through by the use of a base, like the base (9) of figure -2-. ~~different stand by points in the fixed places (frame), where all the guns have.~~ In this case, ~~through a respective~~  
5 ~~formed base for each type of a gun, like the base (9) of figure 2,~~ the base (9) is locked on the frame of the gun so as to be immovable ~~which is embodied either with the fixed gun barrel (K) or with any other gun's fixed point and on which base (9) the magnet (M) is positioned~~ which pulls and attracts the cylinder (1) and the slide (K). In this case, the extension (P) of pin axle (4) doesn't need to be extended till to the  
10 magnet (M), as this is depicted in figure -2-.

The system ~~can~~ may function also without a magnet, ~~with only a mechanical way by using only the mechanical parts, with the assumption that but in this case there will not be imparted increased force to the bullet, therefore any bigger trajectory the bullet will not have longer firing range.~~

15 ~~With~~ Sine the invention being expanded beyond its limits, but by the proper configuration forming of the invention's main attachments parts, like the cylinder's and axle's shape, the springs' resistance force and the dimensions, (while the spring (3) maintains the specifications of its freedom degree), and without the invention being expanded beyond its limits, the system will be possible to adapt itself fit to any  
20 gun type.

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## CLAIMS

1. A magnetomechanical system of ~~the caused~~ for recoil's reduction in a gun  
~~from a gun's bullet firing upon firing~~, which consists ~~from~~ of successive ~~recoil~~  
5 compression springs in ~~cooperation~~ cooperated with one cylinder and with one  
~~mechanism~~ axle, which brings supports a magnet, and is ~~comprised from~~  
distinguished by

a) one the spring (5) of which the ~~one-left~~ edge is ~~osculated with~~ abuts on the slide  
(K) and its other right edge ~~with~~ abuts on the wall flange (T) in of the  
10 transversal cylinder's (1) ~~body~~ exterior diameter; and

which cylinder (1) is separated, through by a contraction diaphragm (Y), is  
~~separated into~~ in two chambers, the chamber (A) and the chamber (B), where  
in wherein chamber (A), the spring (2) is positioned; and

where wherein through chamber (A) and through chamber (B) is passing the pin  
15 axle (4) is passing through as it comes through chamber (A) ~~also~~ in the right  
edge of which pin axle (4), the separator round nut (7) is embodied screwed;  
and

which round nut (7), on the one hand, holds the spring (2) in the chamber (A),  
and on the other hand, it ~~consists-a~~ is being a part of the fixed gun's frame;

20 while ~~intermediately of its length~~, the pin the axle (4) close to the middle of its  
length brings is formed to the separator collar (8), which collar (8) is  
~~interrupted from~~ locked by the diaphragm (Y);

b) and ~~from the fact that~~ the spring (3) is positioned in chamber (B) ~~the spring~~ (3)  
is ~~positioned with easiness~~, which spring (3) is smaller in height length ~~from~~  
25 than the chamber's (B) height length, the entrance of which chamber (B) ~~is~~  
secured is locked ~~from~~ by the transversal cover set screw (6), through which set  
screw (6), the pin's axle's (4) extension (P) is coming through and on the left  
edge of which extension (P) the magnet (M) is embodied screwed and is ~~secured~~  
is locked with the component nut (E), or through by the use of one base (9),  
30 which base (9) ~~is embodied~~ is locked on the frame ~~on a fixed point of the gun~~  
(frame) ~~or on other pre-existed support points under the gun barrel, which are~~  
~~located on the gun's fixed parts and are destined for the support of various~~

~~auxiliary components, and on which base (9) the magnet (M) is fixed without using anymore the pin's axle's (4) extension (P);~~

5 c) ~~and from the fact that the magnet's destination part is to act unstoppable pull permanently attract, on the one hand, to the slide (K), and on the other hand, to the cylinder (1) with momentum and direction towards the axis of their course towards the gun barrel's exit and hence opposite towards their retrogression; direction opposite of the slide's (K) and of the cylinder's (1) recoil direction;~~

10 d) ~~and from the fact that during the bullet's firing time upon firing, the pressure of the developed gases reaches touches the point, where it is appointed as which is critical for the pulling-ability attractive power that the magnet (M) has, in order to hold for the attraction of the slide (K) and the chamber of the cylinder (1), causing to them the instantaneous-expected delay short time lag before their departure (according to the upper priority degree); they start to recoil;~~

15 e) ~~and from the fact that through the upper instantaneous delay the pre-mentioned time lag through which causes the maximum expansion of gases is caused from the gun barrel's muzzle, hence the slide (K) recoils more gently, a bigger initial speed is given to the bullet is given, resulting to its trajectory increase; and thereby the bullet gets longer firing range;~~

20 f) ~~and from the fact that the spring (3) through its freedom degree on either side of its reference points functions, in chamber (B), operates as an inertia system and acts as percussive mechanism of instantaneous absorption of while absorbs the rest of the slide's (K) recoil energy, decelerating any of its further retrogression recoil of the slide (K), as because the most of the slide's (K) energy, which the slide was carrying, was absorbed from the progressive compression of the two previous springs (5) and (2); spring (5) and the spring (2);~~

25 g) ~~and from the fact that this mechanism's the final form of the magnetomechanical system is capable to may differ in to its component's shape, and may also differ to the springs' resistance force of its springs and to their and number quantity in order to be adapted so as to fit to any different gun type.~~

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2. A magnetomechanical system ~~of for the caused recoil's reduction from a gun's bullet firing in a gun upon firing~~, which consists of successive springs in ~~cooperation-cooperated~~ with one cylinder and with one ~~mechanism axle~~, which



brings supports a magnet according to claim -1-, and ~~is characterized from the fact that is distinguished by~~

a) the removal of the extension (P) of the ~~pin's~~ axle (4) or the removal of the base (9), and therefore the magnet's (M) removal, ~~expansion (P)~~ makes lets the mechanical system of the invention be operational, ~~anymore a mechanical one, but~~ without the bullet's firing range ~~trajectory~~ being increased;

b) ~~and from the fact that~~ its mechanical compartments parts are formed properly, so that this mechanical system ~~to be adaptable~~ may fit to any different gun type.

## ABSTRACT

### ~~A MAGNETOMECHANICAL SYSTEM OF THE CAUSED RECOIL'S REDUCTION FROM A GUN'S BULLET FIRING.~~

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### MAGNETOMECHANICAL SYSTEM FOR REDUCTION OF THE RECOIL OF A GUN.

10 ~~This invention is referred to the creation of A Magnetomechanical or mechanical  
system of for the recoil's reduction in a gun and hence of the gun barrel's rebound  
upon firing during the shooting time.~~

15 ~~This system is composed from consists of two the successive springs (5) and (2) in  
cooperation cooperated with the a cylinder (1), an axel from and a magnet (M). The  
magnet which attracts pulls, on the one hand, the gun's slide (K), and on the other  
hand, to the cylinder, (1) a reverse this time retrogression of these two retrogressive  
components in direction opposite of the slide's and the cylinder's recoil direction. and  
from the A third recoil spring, (3), which because of its position and size, operates  
acts as an extra suspension of for the gun's recoil's reduction, and as an accelerator  
for slide's reciprocating motion. quick—execution—and reduction~~